Space Weather Forecast

Issued on Wednesday, 02 February 2022 at 13:05 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Slight chance of G1 Minor Storms during day 1 into day 2 (2nd / 3rd February) from CME effects. Chance Moderate flares (R1/R2 Radio Blackouts).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low solar activity with a number of Common class flares were observed. These were mainly from two regions close to the eastern limb and the large region in the northwest quadrant of the Sun. There is also one other smaller, simpler and benign region on the visible disc. Following a flare at 01/2236 UITC, there may be a coronal mass ejection but further satellite imagery is needed to confirm this, and whether there is an Earth-directed component. No other Earth-directed CMEs were observed in available imagery in the last 24 hours.
Solar Wind / Geomagnetic Activity: The solar wind started the period at ambient values, but has since increased to slightly elevated levels with the arrival of a CME at Earth.
The magnetic field strength was weak, before suddenly rising to moderate levels, with the arrival of the CME (which left the Sun on 29th Jan). The important north-south component was mostly positive (northwards) during the period, only switching to negative (southward) for a short time on arrival of the CME. This meant that geomagnetic activity was mostly Quiet (Kp1-2), only briefly increasing to Unsettled to Active (Kp3-4) from 0/2100 to 02/0300 UTC.
Energetic Particles / Solar Radiation: The count of energetic particles (high energy protons) was at background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Mainly Low to Moderate solar activity is expected through the period, but with a chance of isolated Moderate-class flares due to the presence of numerous fairly large sunspots, which may become unstable.
Solar Wind / Geomagnetic Activity: A CME which left the Sun on 29 January arrived at Earth overnight on the 1st Feb, with it's weak effects likely to continue through day 1 (2nd Feb) into day 2 (3rd Feb). Solar winds are expected to remain slightly elevated during day 1 (2nd Feb) before waning back to background levels on day 2 (3rd Feb) and into day 3 (4th Feb). Solar winds may then become elevated by day 4 (5th Feb) due to a fast wind from a coronal hole. As the effects of the weak CME wane, geomagnetic conditions are likely to remain mostly quiet, although still with a chance of active (kp4) intervals and a slight chance of G1 Minor storm intervals (Kp5) during day 1 (2nd Feb) into day 2 (3rd Feb). Active intervals are then possible later on the 4th and into the 5th February due to coronal hole 49's high speed wind arriving at Earth.
Energetic Particles / Solar Radiation: The count of energetic particles (high energy protons) is forecast to remain at background levels whilst the sunspots we are presented with remain quiet and stable, with no radiation storms currently expected.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	20	10	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	30	30	30
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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